CONTENTS

Volume 20, Issue Nos. 1-12 (1984)

International Journal for

NUMERICAL METHODS IN ENGINEERING

Issue No. 1

Numerically Efficient Procedures for Dynamic Contact Problems: N. Madsen 1

Numerical Evaluation of Stress Intensity Factor and *J* Integral in Three-point Bend Specimen: C. R. Pratap, R. K. Pandey, R. Natarajan and K. N. Gupta 15

A Complex Variable Boundary Element Method: Development: T. V. Hromadka II and G. L. Guymon 25

Optimum Design Sensitivity Based on Approximation Concepts and Dual Methods: L. A. Schmit and K. J. Chang 39

The Numerical Solution of Two Generalizations of the Neumann Moving Interface Problem into Two Dimensions: H. J. Schulze, J. A. Howarth and G. Poots 77

Optimal Control Finite Element Approximation for Penalty Variational Formulation of Three-dimensional Navier–Stokes Problem: K-T. Li, A-X. Huang, Y-C. Ma, D. Li and Z-X. Liu 85

A Taylor–Galerkin Method for Convective Transport Problems: J. Donea 101

Compact Analytic Expressions of Two-dimensional Finite Difference Forms: M. Reali, R. Rangogni and V. Pennati 121

An Integral Equation Method for Non-self-adjoint Eigenvalue Problems and its Applications to Non-conservative Stability Problems: N. Tosaka and K. Kakuda 131

Numerical Solutions to Some Free Surface Flows through Nonhomogeneous Media: J. Remar, J. C. Bruch, Jr. and J. M. Sloss 143

Asymmetric Bending of Axisymmetric Shells: J. Vykutil 169

SHORT COMMUNICATIONS

A Note on Symmetry Considerations in the Transient Response of Unsymmetrically Laminated Anisotropic Plates: J. N. Reddy 175

Chebyshev Filtering and Lanczos' Process in the Subspace Iteration Method: C. H. Loh 182

A Comment on the Effectiveness of Uniform Finite Element Refinements: S. M. Yunus and M. S. Shephard 187

ANNOUNCEMENTS 195

Indexed or abstracted by 'Current Contents', 'Science Citation Index' and other leading Indexing/Abstracting Services.

Issue No. 2

Reparametrization and its Application in Computer-aided Geometric Design: A. A. Ball 197

Modelization of Phase Changes by Fictitious Heat Flow: J. Roose and O. Storrer . . 217

A Contribution to the Computation of Rotor Moments of Inertia Suitable for Computer Processing: H. Witfeld 227

A New Class of Transitional Blended Finite Elements for the Analysis of Solid Structures: J. C. Cavendish and C. A. Hall 241

Boundary Integral Equation Method for Linear Porous-elasticity with Applications to Soil Consolidation: A. H-D. Cheng and J. A. Liggett 255

Boundary Integral Equation Method for Linear Porous-elasticity with Applications to *Fracture Propagation: A. H-D. Cheng and J. A. Liggett* 279

Non-iterative Solution of a Tridiagonal-type Matrix Coupled by Diagonal Submatrices: M. D. Deshpande 297

Shells of Revolution with Local Deviations: K. J. Han and P. L. Gould 305

Explicit Forms for the Tangent Modulus Tensor in Viscoplastic Stress Analysis: R. A. Brockman 315

Adaptive Eulerian–Lagrangian Finite Element Method for Advection–Dispersion: S. P. Neuman 321

The Solution of Higher Order Integration Formulae for Dynamic Response Equations by the Conjugate Gradient Method: A. L. Carter, G. R. Shiflett and A. J. Laub . 339

Ritz Finite Element Approach to Nonlinear Vibrations of Beams: B. S. Sarma and T. K. Varadan 353

A Two-dimensional Analysis of the Wave Equation Model for Finite Element Tidal Computations: I. P. E. Kinnmark and W. G. Gray 369

SHORT COMMUNICATIONS

On Reduced Matrix Inversion for Operator Splitting Methods: T. Belytschko and W. K. Liu 385

Pure Opening Mode Stress-intensity Factor Computation for Elliptical Crack Fronts: C. Manu 387

ANNOUNCEMENTS 391

Issue No. 3

On Quadrature and Singular Finite Elements: J. S. Solecki and J. L. Swedlow . . . 395

Computation of Shear Bands Using a New Variational Approach, I: Theory and Elementary Examples: Y. K. Lee and J. L. Swedlow 409

Computation of Shear Bands Using a New Variational Approach, II: Use of Weight Functions in a Crack Problem: Y. K. Lee and J. L. Swedlow 423

A Finite Element Model for Double Diffusive Convection: J. C. Heinrich 447

An Optimized Solution for the Diffusion Equation on a Non-uniform Grid: R. J. Sobey 465

Deflection of Thick Beams of Multimodular Materials: C. W. Bert and F. Gordaninejad 479

Numerical Solution of a Parabolic System with Coupled Nonlinear Boundary Conditions: T-J. Liu 505

On the Efficiency and Accuracy of the Boundary Element Method and the Finite Element Method: S. Mukherjee and M. Morjaria 515

An 8-node Brick Finite Element: M. J. Loikkanen and B. M. Irons 523

An Assumed Stress Hybrid Curvilinear Triangular Finite Element for Plate Bending: L. S. D. Morley 529

The Maximum Principle for Bilinear Elements: I. Christie and C. Hall 549

A Note on Discontinuous Numerical Solutions of the Kinematic Wave Motion: R. W. Lewis, K. Morgan, E. D. L. Pugh and T. J. Smith 555

Economy and Convergence of Notch Stress Analysis Using Boundary and Finite Element Methods: D. Radaj, W. Möhrmann and G. Schilberth 565

SHORT COMMUNICATIONS

An Invariant Eight-node Hybrid-stress Element for Thin and Thick Multilayer Laminated Plates: R. L. Spilker 573

Analysis of Multi-layer Laminates Using Three-dimensional Super-elements: R. Jones, R. Callinan, K. K. Teh and K. C. Brown 583

ANNOUNCEMENTS 588

Issue No. 4

A Shear-flexible Triangular Finite Element Model for Laminated Composite Plates: H. V. Lakshminarayana and S. S. Murthy 591

Solution of Linear Equations for Small Computer Systems: N. Ida and W. Lord . . 625

Finite Elements with Increased Freedom in Choosing Shape Functions: P. G. Bergan and M. K. Nygård 643

Scalar Potentials in Multiply Connected Regions: M. L. Brown 665

Finite Element Approach to Propagation in Elliptical and Parabolic Waveguides: P. Daly 681

The Application of Shape-preserving Splines for the Solution of Differential Equations: M. M. Shoucri and R. M. Shoucri 689

Minimum-weight Design of Trusses by an Optimality Criteria Method: R. J. Allwood and Y. S. Chung 697

The Role of Time Integration in Suspension Bridge Dynamics: F. Brancaleoni and D. M. Brotton 715

A Memory-economic Frontwidth Reduction Algorithm: P. P. Silvester, H. A. Auda and G. D. Stone 733

Algorithms for Refining Triangular Grids Suitable for Adaptive and Multigrid Techniques: M. C. Rivara 745

The Stefan Problem: Computing without the Free Boundary: D. Blanchard and M. Fremond 757

SHORT COMMUNICATIONS

Hellinger–Reissner Principles for Plate and Shell Finite Elements: L. S. D. Morley 773

On the Use of the Product Approximation Technique in Nonlinear Galerkin Methods: L. Abia and J. M. Sanz-Serna 778

LETTER TO THE EDITOR 780

ANNOUNCEMENTS 783

Issue No. 5

A C^0 Triangular Plate Element with One-point Quadrature: T. Belytschko, H. Stolarski and N. Carpenter 787

A Recursive Quadratic Programming Method with Active Set Strategy for Optimal Design: A. D. Belegundu and J. S. Arora 803

Comparative Study of Six Explicit and Two Implicit Finite Difference Schemes for Solving One-dimensional Parabolic Partial Differential Equations: D. L. Roberts and M. S. Selim 817

Two High-order Numerical Methods for Solving Boundary-value Nonlinear Ordinary Differential Equations: R. P. Tewarson 845

A Simple Element for Static and Dynamic Response of Beams with Material and Geometric Nonlinearities: T .Y. Yang and S. Saigal 851

Surface Integral Finite Element Hybrid (SIFEH) Method for Fracture Mechanics: B. S. Annigeri and M. P. Cleary 869

Formulation Methods of Geometric and Material Nonlinearity Problems: M. S. Gadala, M. A. Dokainish and G. AE. Oravas 887

Optimization for Vibration Isolation: W. V. Nack 915

Efficient Linear and Nonlinear Heat Conduction with a Quadrilateral Element: W. K. Liu and and T. Belytschko 931

A Robust Incomplete Choleski-conjugate Gradient Algorithm: M. A. Ajiz and A. Jennings 949

Double Noding Technique for Mixed Mode Crack Propagation Studies: B. M. Liaw, A. S. Kobayashi and A. F. Emery 967

LETTER TO THE EDITOR 979

BOOK REVIEWS 980

ANNOUNCEMENTS 981

Issue No. 6

Minimum Norm Solutions to Linear Elastic Analysis Problems: I. Kaneko and R. J. Plemmons 983

Path Independent Integrals for Computing Stress Intensity Factors at Sharp Notches in Elastic Plates: G. B. Sinclair, M. Okajima and J. H. Griffin 999

A Further Look at Newmark, Houbolt, etc., Time-stepping Formulae: W. L. Wood . 1009

A Discrete Singularity Formulation for Solving Steady, Fully Developed Duict Flows: H. Yano, S. Fukutani, A. Kieda and T. Oshima 1019

Finite Layer Analysis of Layered Elastic Materials Using a Flexibility Approach. Part I —Strip Loadings: J. C. Small and J. R. Booker 1025

An Efficient Algorithm to Generate Maximum Entropy Distributions: P. C. Basu and A. B. Templeman 1039

Numerical Solution of Nonlinear Inverse Heat Conduction Problem with a Radiation Boundary Condition: R. C. Mehta 1057

A Model of Binary Alloy Solidification: D. G. Wilson, A. D. Solomon and V. Alexiades 1067

The Post-processing Approach in the Finite Element Method—Part 1: Calculation of Displacements, Stresses and Other Higher Derivatives of the Displacements: I. Babuška and A. Miller 1085

The Post-processing Approach in the Finite Element Method—Part 2: The Calculation of Stress Intensity Factors: I. Babuška and A. Miller 1111

Limit Analysis of Fastener Groups under Eccentric Load: A. G. Kamtekar and W. H. Wittrick 1131

SHORT COMMUNICATIONS

Analytical Integration Formulae for Linear Isoparametric Finite Elements: D. K. Babu and G. F. Pinder 1153

Least Squares Strain Smoothing for the Eight-node Serendipity Plane Stress Element: C. Jeyachandrabose and J. Kirkhope 1164

OBITUARY 1167

LETTERS TO THE EDITOR 1169

BOOK REVIEWS 1175

CONFERENCE DIARY 1176

Issue No. 7

The Accelerated Power Method: P. Roberti 1179

Finite Element Analysis of Wave Motion: M. Kawahara and T. Miwa 1193

Second Derivative Methods Applied to Implicit First- and Second-order Systems: C. A. Addison and I. Gladwell 1211

An Explicit Analysis of Stummel's Patch Text Examples: Zhong-Ci Shi 1233

A Finite Difference Calculation Procedure for Three-dimensional Turbulent Separated Flows: A. Nakayama 1247

The Cylinder in the Wind Tunnel, Revisited: W. G. Habashi and P. L. Kotiuga . . . 1261

Generalized Petrov–Galerkin Methods for the Numerical Solution of Burgers' Equation: B. M. Herbst, S. W. Schoombie, D. F. Griffiths and A. R. Mitchell 1273

Boundary Element Methods for Optimization of Distributed Parameter Systems: R. A. Meric 1291

The Methods of Gellert and of Brusa and Nigro are Padé Approximant Methods: R. M. Thomas and I. Gladwell 1307

Reduction Methods for Nonlinear Steady-state Thermal Analysis: A. K. Noor, C. D. Balch and M. A. Shibut 1323

SHORT COMMUNICATIONS

A General Iterative Method to Design Kármán–Trefftz and Joukowsky Airfoils: M. A. Yükselen and M. Z. Erim 1349

A Non-standard Mesh Refinement Procedure through Node Labelling: M. Fortin and P. Tanguy 1361

On a Certain Mixed Variational Theorem and a Proposed Application: E. Reissner 1366

BOOK REVIEW 1369

CONFERENCE DIARY 1370

Issue No. 8

Bending of Bilinear Quadrilateral Shell Elements: L. S. D. Morley 1373

A Procedure for Analysing Space Frames with Partial Warping Restraint: Y-B. Yang and W. McGuire 1377

h- and *p*-version Finite Element Analyses of a Rhombic Plate: D. W. Wang, I. N. Katz and B. A. Szabo 1399

Numerical Formulation for a Higher Order Plane Finite Dynamic Element: K. K. Gupta 1407

An Iterative Approach for the Evaluation of Delamination Stresses in Laminated Composites: R. S. Barsoum and C. E. Freese 1415

A Consistent and Accurate Procedure for Obtaining Difference Equations from Differential Equations: W. Lick and T. Gaskins 1433

An Improved Isoparametric Transformation for Finite Element Analysis: M. A. Celia and W. G. Gray 1443

An Improved Explicit Finite Element Method for Tidal Flow: H. Kikukawa and H. Ichikawa 1461

Incremental Elastoplastic Stiffness Matrix for Materials Obeying the Principal Stress Yield Criterion: O. J. A. Goncalves F° and D. R. J. Owen 1477

The Self-equilibration of Residuals and Complementary *A Posteriori* Error Estimates in the Finite Element Method: D. W. Kelly 1491

Numerical Laplace Transformation and Inversion in the Analysis of Physical Systems: D. J. Wilcox and I. S. Gibson 1507

Evaluation of a New Method for Numerical Laplace Transformation and Inversion: D. J. Wilcox and I. S. Gibson 1521

A Unified Set of Single Step Algorithms. Part 1: General Formulation and Applications: O. C. Zienkiewicz, W. L. Wood, N. W. Hine and R. L. Taylor. 1529

SHORT COMMUNICATIONS

A Note on 'A Two-step Approach to Finite Element Ordering': A. Kaveh . . . 1553

A Solution Technique for Indefinite Systems of Mixed Finite Elements: F. A. Mirza 1555

CONFERENCE DIARY 1562

Issue No. 9

Incremental Shakedown Analysis in the Case of Thermal Effects: M. Kleiber and J. A. König 1567

Limitations for the Use of an Exact Formula for Receptance Reanalysis: J. A. Brandon 1575

Partitioned Rational Runge Kutta for Parabolic Systems: W. K. Liu, T. Belytschko and Y. F. Zhang 1581

An Interpolation Method for an Irregular Net of Nodes: T. Liszka 1599

A Finite Element Analysis of Metal-forming Problems with an Elastic-viscoplastic Material Model: A. Chandra and S. Mukherjee 1613

Numerical Evaluation of the Quarter-point Crack Tip Element: V. E. Saouma and D. Schwemmer 1629

A Direct Search Package for Unconstrained Minimization: M. V. C. Rao and K. S. Chandra 1643

Structural Design Sensitivity Analysis with General Boundary Conditions: Static Problem: C. C. Hsieh and J. S. Arora 1661

An Efficient Zooming Method for Finite Element Analysis: I. Hirai, B. P. Wang and W. D. Pilkey 1671

Rational Approach for Assumed Stress Finite Elements: T. H. H. Pian and K. Sumihara 1685

The Numerical Treatment of Laplace Transforms: I. The Koizumi Inversion Method: W. Squire 1697

On the Computational Significance of the Strain Space Formulation of Plasticity Theory: W. C. Moss 1703

Finite Element Criteria for Some Shells: L. S. D. Morley 1711

Animating Structure Plots: Experiments with a PERQ: B. Colyer 1729

A Partial-boundary Element Approach to the Elastic Torsion Problem of a Prismatic Beam with a Cracked Rectangular Cross-section: C. Shangchow 1745

SHORT COMMUNICATION

An Effective Finite Element Approach for Calculation of Potential Distribution in a Multi-dielectric Cable: M. Y. Sanavullah and K. Dharmalingam 1751

LETTER TO THE EDITOR 1756

BOOK REVIEWS 1757

ANNOUNCEMENTS 1758

CONFERENCE DIARY 1760

Issue No. 10

An Automated Design Scheme: Weight Minimization of a Single Hulled Ship Compartment: M. Chowdhury and J. B. Caldwell 1763

Use of Minimum Surface Theory to Aid Finite Element Contour Plotting: G. P. Steven 1791

The Design of a Variable-step Integrator for the Simulation of Gas Transmission Networks: T. S. Chua and P. M. Dew 1797

Transformation of Dependent Variable in the Finite Element Solution of Some Phase Change Problems: S. Borshukova and P. Konovski 1815

Optimal Shape Remodelling of Linearly Elastic Plates Using Finite Element Methods: M-S. Na, N. Kikuchi and J. E. Taylor 1823

A Statically Determinate Truss Model for Thin Shells: One-surface Analysis (Membrane Hypothesis): M. N. Pavlović 1841

A Statically Determinate Truss Model for Thin Shells: Two-surface Analysis (Bending Theory): M. N. Pavlović 1863

A Generalized Finite Difference Scheme for Convection-dominated Metal-forming Problems: A. A. Tseng 1885

Orthogonal Collocation with 'Adaptive' Finite Elements: M. F. N. Mohsen and G. F. Pinder 1901

Finite Plane Strain Deformations of Nonlinear Viscoelastic Rubber-covered Rolls: C. N. Bapat and R. C. Batra 1911

A Hybrid Algorithm for Reducing Matrix Bandwidth: B. A. Armstrong 1929

SHORT COMMUNICATION

On the Use of Quarter-point Boundary Elements for Stress Intensity Factor Computations: J. Martínez and J. Domínguez 1941

LETTERS TO THE EDITOR 1951

BOOK REVIEWS 1951

ANNOUNCEMENTS 1953

CONFERENCE DIARY 1957

Issue No. 11

Substructure Condensation Using Modified Decomposition: T-Y. Han and J. F. Abel 1959

Automatic Three-dimensional Mesh Generation by the Modified-octree Technique: M. A. Yerry and M. S. Shephard 1965

Analysis of Laminated Composite Shells Using a Degenerated 3-D Element: W. C. Chao and J. N. Reddy 1991

Description of the Orthogonal Collocation Method for Modelling Flames in Furnaces: K. Chandrasekharan and F. E. J. Briffa 2009

On the Convergence Rate of the Boundary Penalty Method: Z-C. Shi 2027

A Conservative Finite Element Method for Heat Conduction Problems: J. Banaszek 2033

Incremental Finite Element Analysis of Geometrically Altered Structures: J. Ghaboussi and D. A. Pecknold 2051

A Combination of the Finite Element and Singular-integral Equation Methods for the Solution of the Generally Cracked Body: P. S. Theocaris, G. Tsamasphyros and E. E. Theotokoglou 2065

Plastic Straining, Unstressing and Branching in Large Displacement Perturbation Analysis: J. A. Teixeira De Freitas and D. L. Smith 2077

Stresses from Arbitrary Loads on a Penny-shaped Crack: R. N. L. Smith 2093

Linear Multipoint Constraints Applied via Transformation as Part of a Direct Stiffness Assembly Process: M. S. Shephard 2107

Reducing Relative Error from the CVBEM by Proper Treatment of the Known Boundary Conditions: T. V. Hromadka II and G. L. Guymon 2113

A New 48 d.o.f. Quadrilateral Shell Element with Variable-order Polynomial and Rational B-spline Geometries with Rigid Body Modes: C. J. Moore, T. Y. Yang and D. C. Anderson 2121

Development of a Solid Hexahedron Finite Dynamic Element: K. K. Gupta 2143

ANNOUNCEMENTS 2151

CONFERENCE DIARY 2152

Issue No. 12

A Refined Finite Element Model for the Analysis of Elastic–Plastic Frames: L. Corradi and C. Poggi 2155

A Finite Element Method for Contact Problems Related to Fracture Mechanics: G. Yagawa and H. Hirayama 2175

Some Applications of Numerical Methods to the Analysis of the Compression of Articular Cartilage: P. A. Rombult and C. M. McC. Ettles 2197

Analysis of Microwave Ovens Loaded with Lossy Process Materials Using the Transmission-line-matrix Method: El-D. M. El-Sayed and M. N. Morsy 2213

Postbuckling Resonance Analysis of Thin Shells: A. Tesar 2221

A Linearized Analysis of Buckling of Thin Rotational Shells Using the Finite Element Method: R. Delpak 2235

A Total Lagrangian Formulation for the Geometrically Nonlinear Analysis of Structures Using Finite Elements. Part I. Two-dimensional Problems: Shell and Plate Structures: J. Oliver and E. Oñate 2253

Solution of the Partial Eigenproblem by Iterative Methods: M. Papadrakakis 2283

A Unified Set of Single-step Algorithms. Part 2: Theory: W. L. Wood 2303

The Post-processing Approach in the Finite Element Method—Part 3: *A Posteriori* Error Estimates and Adaptive Mesh Selection: I. Babuška and A. Miller 2311

BOOK REVIEW 2325

IN MEMORIAM

S. O. Asplund by A. Samuelsson 2325

Bo Östen Almroth by D. Bushnell 2326

CONFERENCE DIARY 2330

Author Index 2332